

I CLAIM:

1-4. (canceled)

5. (currently amended) An assembled semiconductor device

5 comprising:

a semiconductor chip including at least one bond
pad having an attached metallic interconnection
element, said element made of a material not
capable of reflow during the attachment process;

10 a substrate having at least one contact pad;

said chip interconnection element attached to said
substrate contact pad using an attachment alloy
comprising a ternary alloy of 60.3 to 62.5 weight
percent tin, 36 to 38 weight percent lead, and
15 approximately 1.5 to 1.7 weight percent silver.

6. (canceled)

7. The device according to Claim 5 wherein said ternary
20 alloy comprises about 1.62 weight percent silver, about
36.95 weight percent lead, and about 61.43 weight
percent tin.

8. (currently amended) A method for the assembly of a
semiconductor device having fatigue-resistant interconnection
25 elements, comprising the steps of:

providing a semiconductor chip having at least one
solder bump comprising an alloy of about ten
weight percent tin and about ninety weight
percent lead;

30 providing a solder paste comprising tin and
silver, said solder paste having a reflow
temperature of about 221 °C, said bump alloy

having a melting temperature higher than said
paste reflow temperature;
bringing said solder bump in contact with said
solder paste and immersing said bump partially in
5 said paste;
supplying thermal energy to reflow said solder paste
at about 235 °C;
controlling the amount of energy and time after said
melting of said solder paste so that the molten
10 paste dissolves a pre-determined amount of said
solder bump to form a tin/lead/silver ternary
alloy of about eutectic composition without
melting said solder bump; and
removing said thermal energy to cool said ternary
15 alloy fillet and said bump.

9. The method according to Claim 8 wherein said
solder paste is a binary solder paste having a
composition of 2 to 3 weight percent
silver and 97 to 98 weight percent tin so that the
20 formation of primary Ag_3Sn plates in said fillet is
avoided.

10. The method according to Claim 9 wherein said binary
solder alloy paste has a composition of about 2.5
weight percent silver and about 97.5 weight percent
25 tin.

11. The method according to Claim 8 wherein said solder
paste is a ternary solder paste having up to 20 weight
percent lead, up to 3 weight percent silver, and the
balance tin.

30 12. The method according to Claim 8 wherein said bump
alloy has a melting temperature higher than 275 °C.

13. The method according to Claim 8 wherein said bump alloy comprises about 10 weight percent tin and about 90 weight percent lead.

5 14. The method according to Claim 8 wherein said controlling of energy and time comprises a temperature above 176 °C for about 70 seconds.

10 15. The method according to Claim 8 wherein said ternary alloy comprises about 1.62 weight percent silver, about 36.95 weight percent lead, and about 61.43 weight percent tin.

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